

FIG. 1

The diagram illustrates a two-stage optical system. A vehicle 210 is shown on a horizontal ground line. A vertical line represents the vehicle's longitudinal axis. A sensor unit 220 is mounted on the vehicle. A dashed line represents the optical axis of the first stage, extending from the sensor unit 220 at an angle  $\theta_1$  to the ground. This axis passes through a point 221 on a horizontal line representing the water surface. A second dashed line represents the optical axis of the second stage, extending from point 221 at an angle  $\theta_2$  to the water surface. The distance from the sensor unit 220 to point 221 is labeled  $r_1$ , and the distance from point 221 to the water surface is labeled  $r_2$ . A wavy line below the water surface represents the seabed. A label 211 points to the vehicle's body.

The graph shows the relationship between the ratio of axial to radial field and the angle off axis in radians. The y-axis ranges from -10 to 20, and the x-axis ranges from 0 to 1.4. The curve starts at approximately 19 at 0 radians, decreases to 0 at about 1.0 radian, and then drops to approximately -10 at 1.5 radians.

angle off axis (radians)	Ratio of axial to radial field
0.0	19.0
0.2	3.5
0.4	1.5
0.6	0.5
0.8	0.1
1.0	0.0
1.2	-1.0
1.4	-2.0
1.5	-10.0

FIG. 3

Appl. No. To Be Assigned; Group Art Unit: To Be Assigned  
Dkt. No. 2037.0030000; Batch No.: To Be Assigned  
Inventors. Richard W. FLING *et al.*; Tel. 202/371-2600  
Title. Method and System For Producing A Magnetic Field  
Signal Usable For Locating An Underground Object

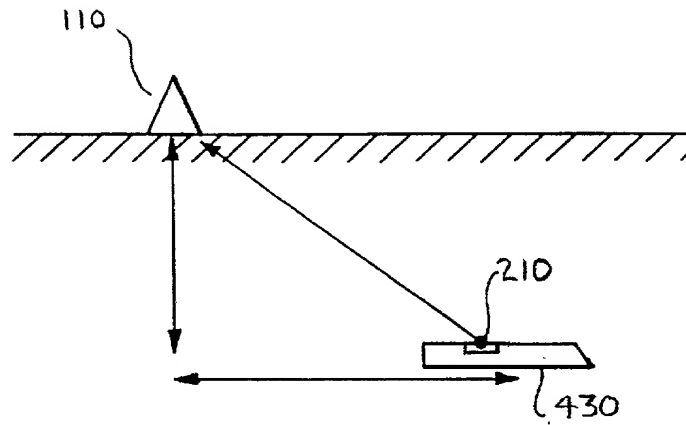


FIG. 4

09418719.080101

# TRANSMIT DEVICE 102

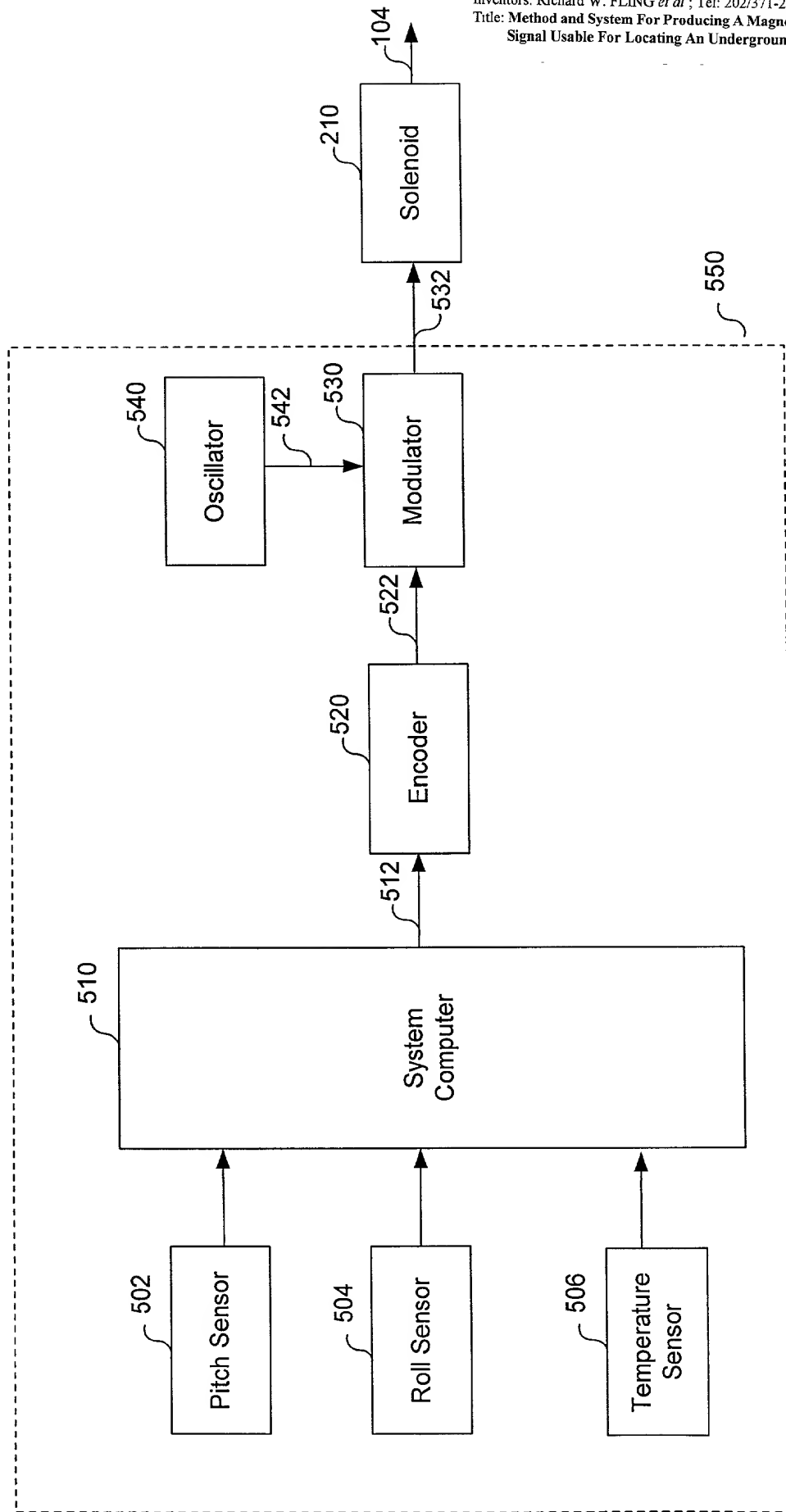


FIG. 5

Appl. No. To Be Assigned, Group Art Unit To Be Assigned  
 Dkt No. 2037.0030000; Batch No.: To Be Assigned  
 Inventors: Richard W. FLING *et al.*, Tel: 202/371-2600  
 Title: Method and System For Producing A Magnetic Field  
 Signal Usable For Locating An Underground Object

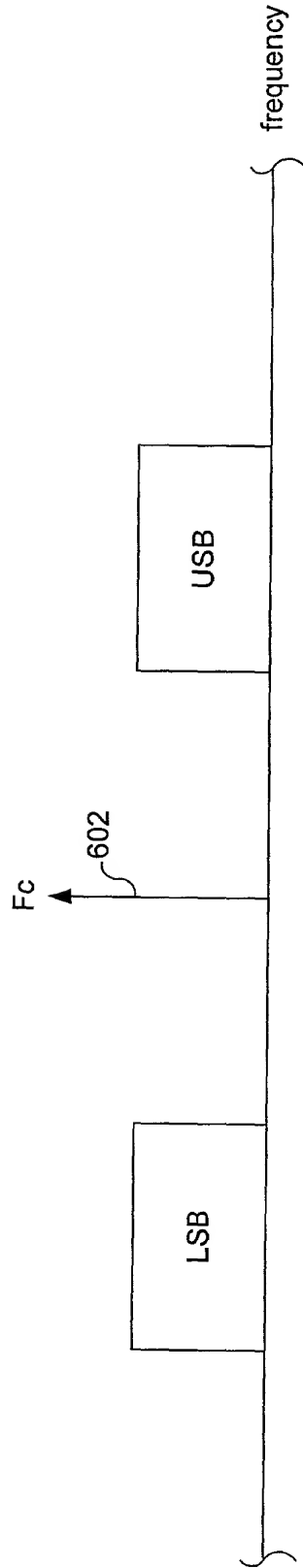


FIG. 6

# RECEIVE DEVICE 110

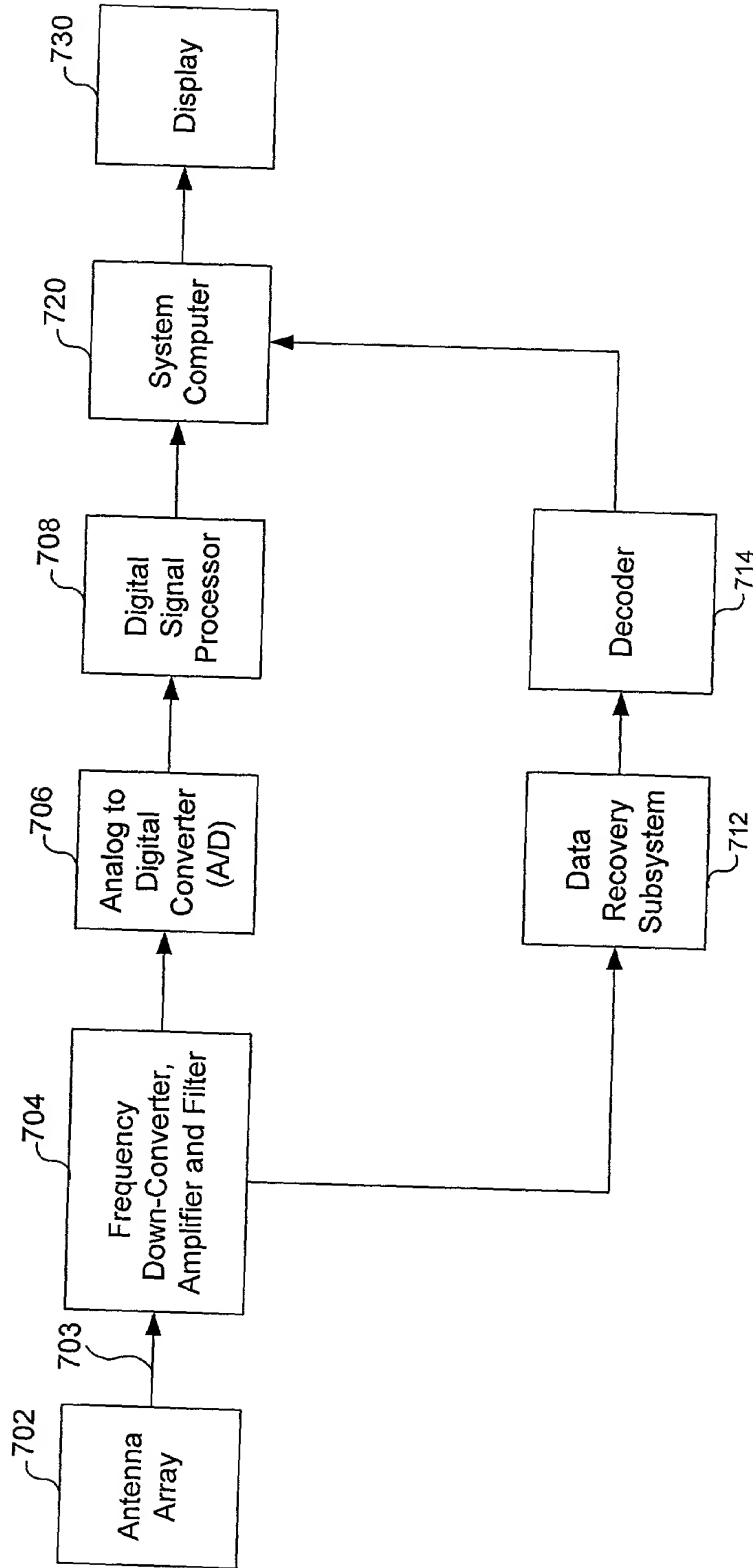


FIG. 7

## DIGITAL SIGNAL PROCESSOR 708

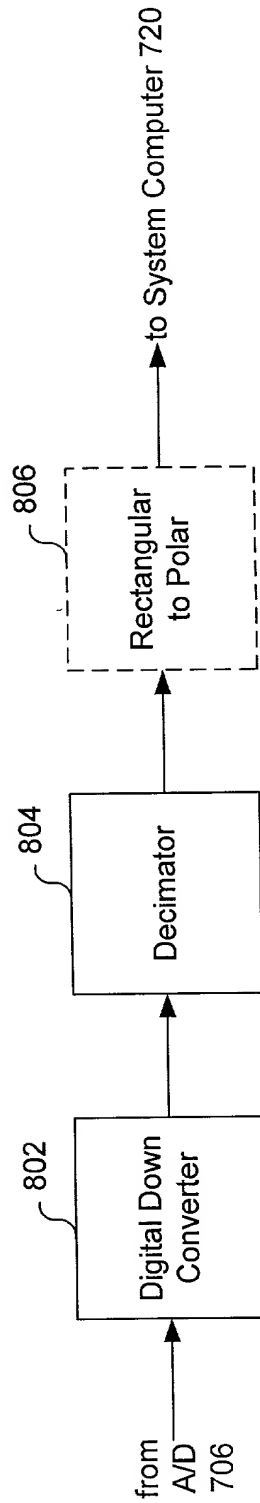


FIG. 8

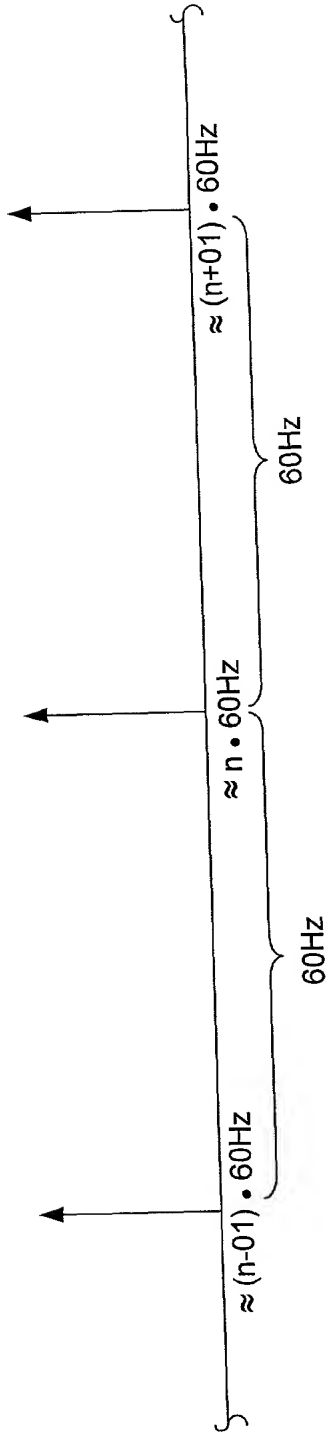


FIG. 9A

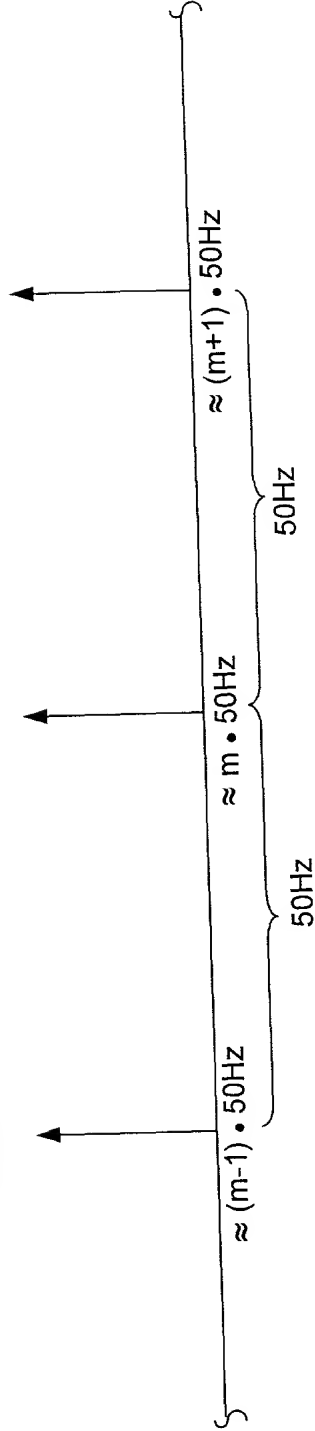


FIG. 9B

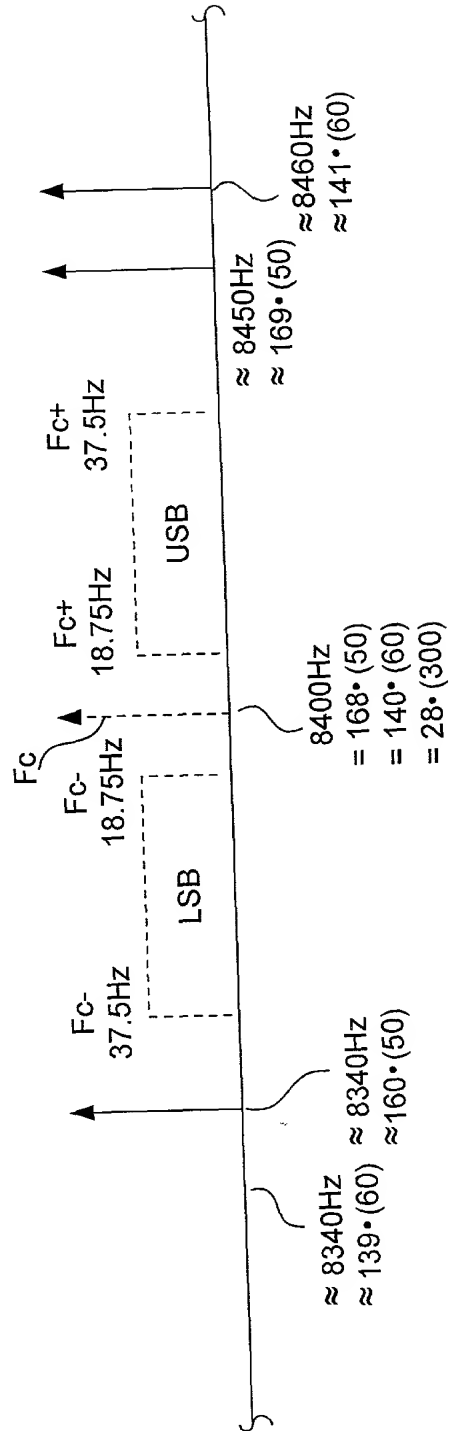
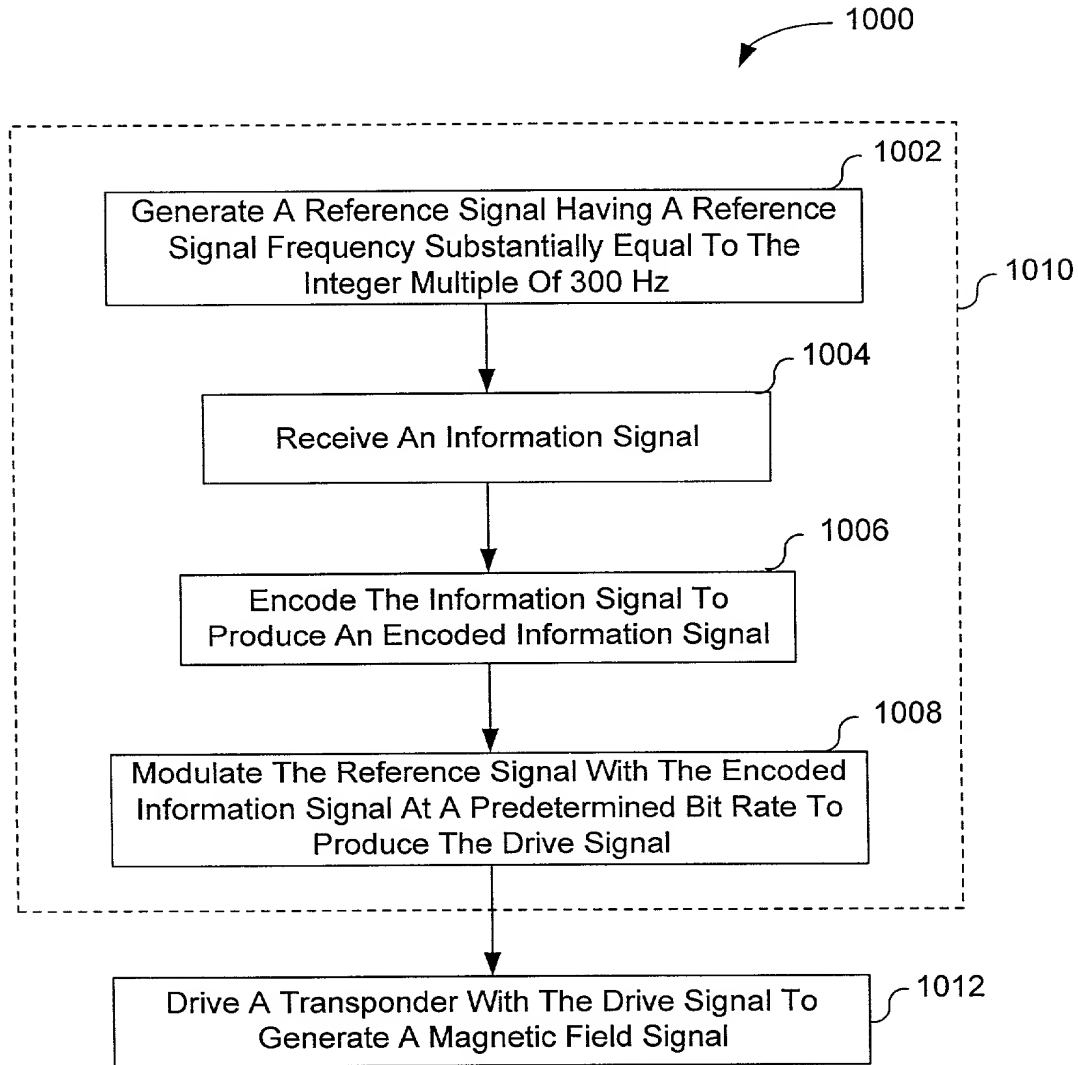


FIG. 9C



**FIG. 10**

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FIG. 11A

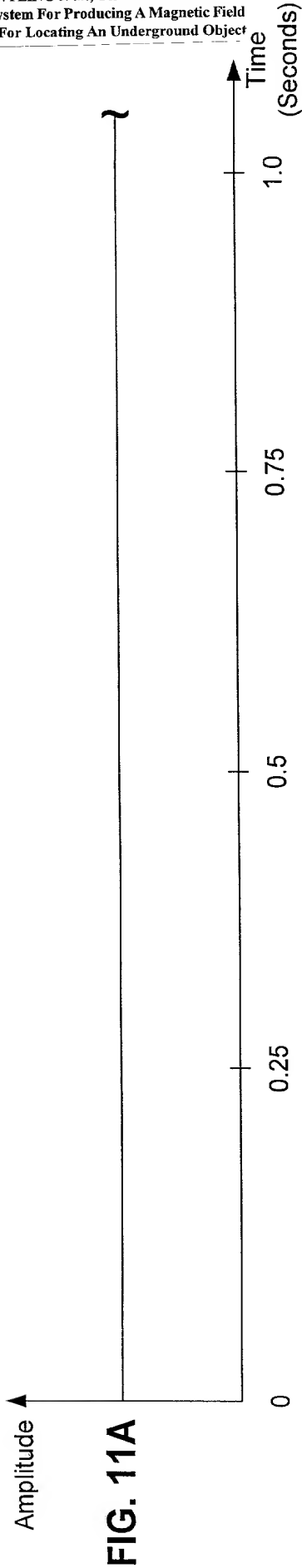


FIG. 11B

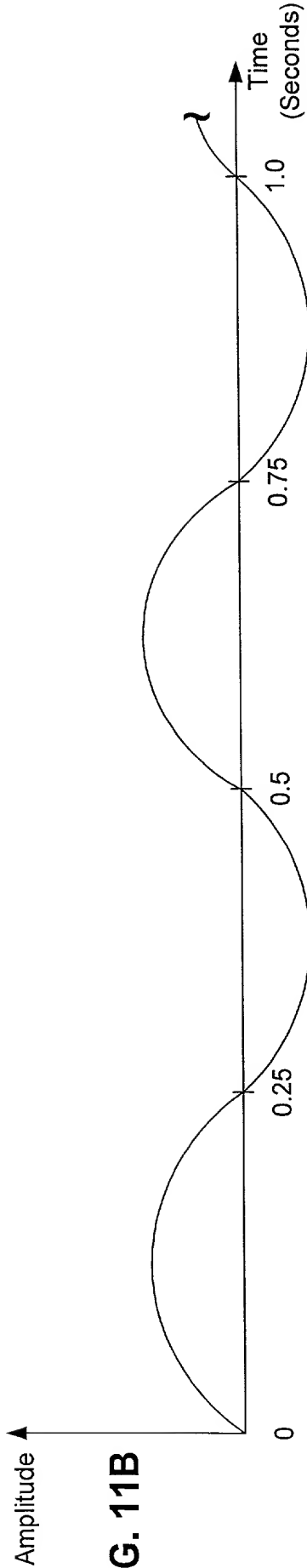
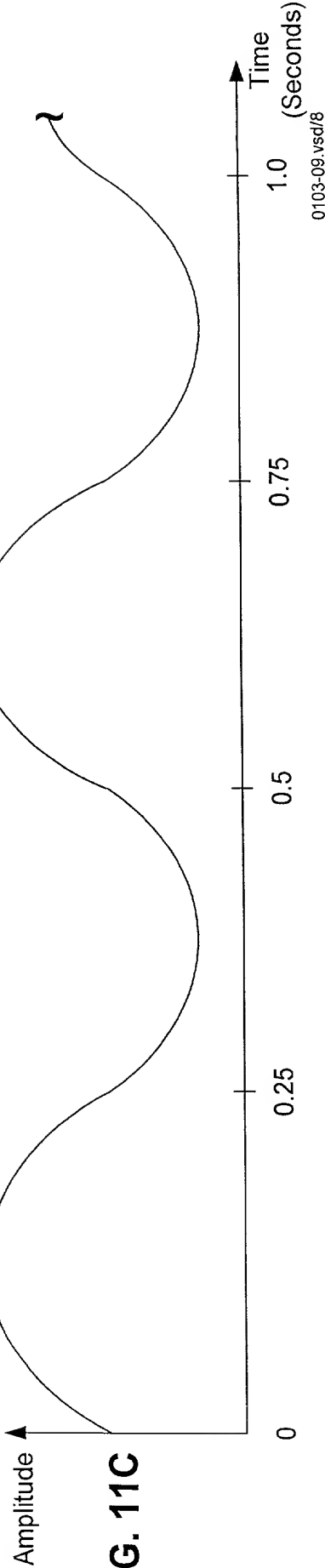


FIG. 11C



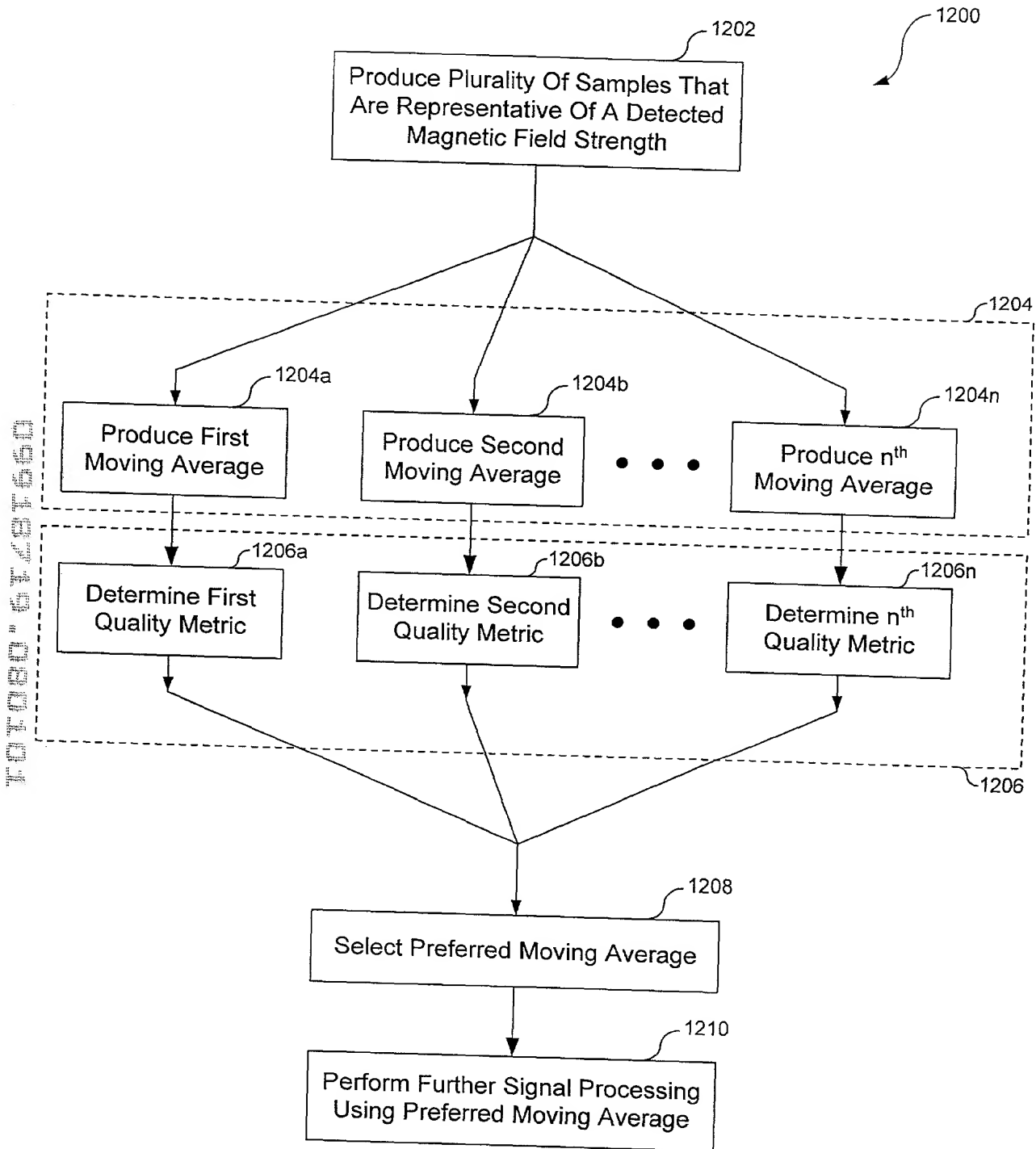


FIG. 12

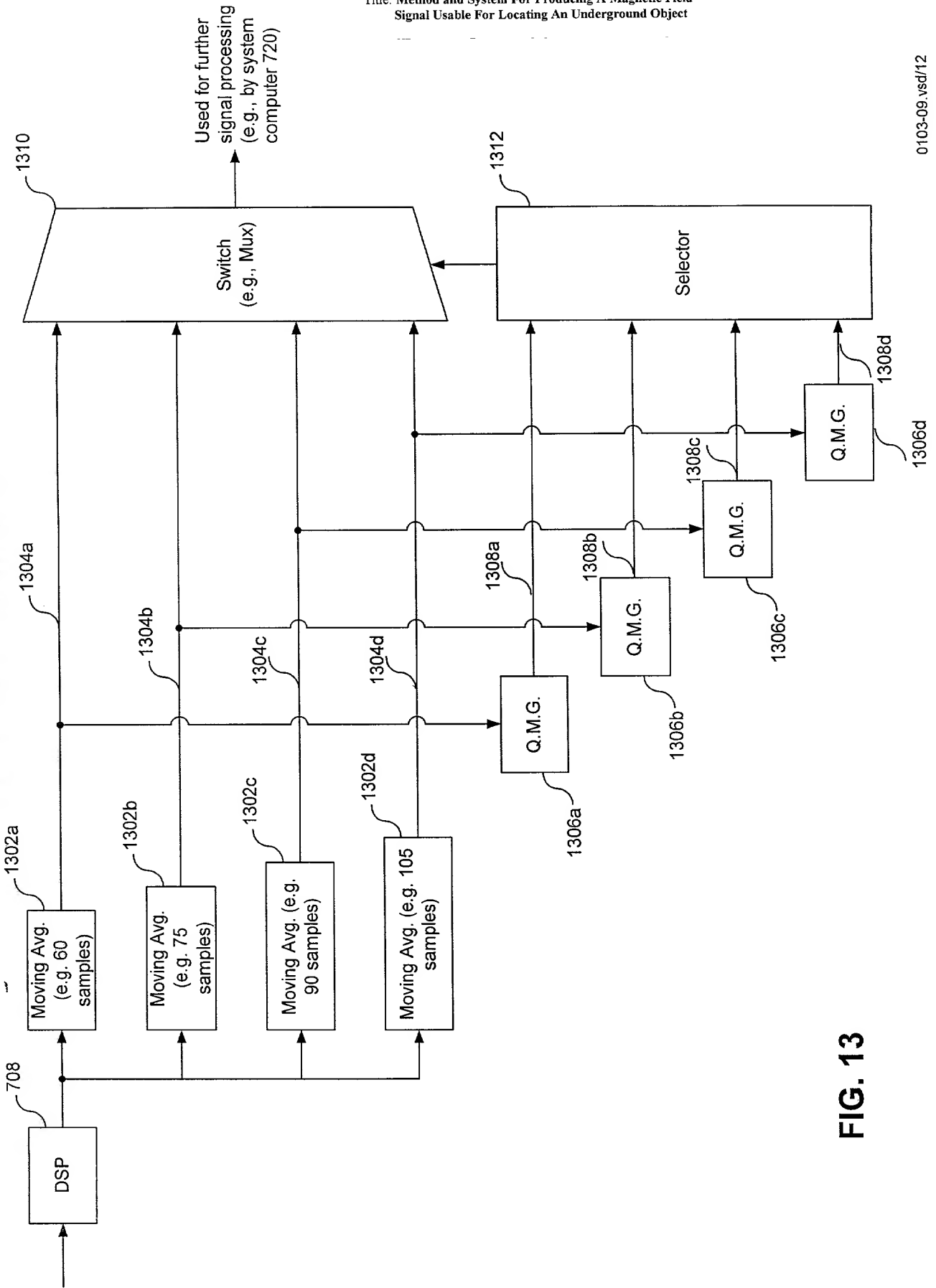


FIG. 13